Amendments to the Claims:

This listing of the claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended) A temperature control system for an inkjet printhead assembly, comprising:

a printhead assembly having ink ejection elements energizable by an electrical pulse having an amplitude and pulse width;

a sensor coupled to the printhead assembly for generating a signal representative of ~~the printhead~~ a temperature of the printhead assembly;

a memory device configured to store an optimal operating temperature of the printhead assembly derived from current printhead assembly operating parameters, a thermal response model of the printhead assembly and an ejection history of the ejection elements;

a controller configured to read a nominal operating pulse width, the signal from the sensor, the optimal operating temperature, the ejection history of the ejection elements and the printhead assembly operating parameters from the memory device for calculating an adjusted pulse width and to create a dynamic estimate of a current temperature distribution across the printhead assembly; and

a firing controller with an ejection sequence sub-controller configured to dynamically and selectively control the sequence of fire pulses, a firing delay sub-controller for reducing electromagnetic interference in the printhead assembly and a fractional delay sub-controller for compensating for scan axis directionality errors of the printhead assembly.

Claim 2 (currently amended) A method of controlling the temperature of an inkjet printhead having ink ejection elements, the method comprising:

sensing a nominal printhead operating temperature;

determining an optimal operating temperature of the printhead as a dynamic estimate of a current temperature distribution across the printhead ~~assembly~~ derived from a thermal response model of the printhead, an ejection history of the ink ejection elements

and a current printhead operating temperature;

using the determined optimal operating temperature for controlling the temperature of the printhead and controlling the sequence of fire pulses; and

reducing electromagnetic interference in the printhead ~~assembly~~ and compensating for scan axis directionality errors of the printhead ~~assembly~~ with a firing controller.

Claim 3 (previously presented) The temperature control system of claim 1 wherein the controller is located on at least one of the printhead or externally on a printer.

Claim 4 (currently amended) The temperature control system of claim 1 wherein the controller reads the nominal operating pulse width and pulse width calibration data from a memory located on the printhead ~~assembly~~.

Claim 5 (previously presented) The temperature control system of claim 1 wherein the controller reads the nominal operating pulse width and pulse width calibration data from a memory located on the printer.

Claim 6 (previously presented) The temperature control system of claim 1 wherein the temperature sensor is an analog temperature sensor.

Claim 7 (previously presented) The temperature control system of claim 6 further including an analog to digital converter for generating a digital format of the measured analog signal.

Claim 8 (previously presented) The temperature control system of claim 1 wherein the temperature sensor is a digital temperature sensor.

Claim 9 (previously presented) The temperature control system of claim 1 wherein the temperature sensor includes multiple temperature sensors distributed

around the printhead so as to provide a global measurement of the printhead temperature.

Claim 10 (previously presented) The temperature control system of claim 4 wherein the pulse width calibration data is in the form of an equation.

Claim 11 (previously presented) The temperature control system of claim 4 wherein the pulse width calibration data is in a look-up table.

Claim 12 (currently amended) A method of controlling the temperature of an inkjet printhead having ink ejection elements energizable by an electrical pulse having an amplitude and pulse width, comprising:

reading a nominal printhead operating temperature, a nominal operating pulse width and pulse width calibration data;

determining an optimal operating temperature of the printhead as a dynamic estimate of a current temperature distribution across the printhead ~~assembly~~ derived from a thermal response model of the printhead, an ejection history of the ink ejection elements and a current printhead operating temperature;

determining a pulse width adjustment factor based on the pulse width calibration data, the optimal operating temperature and the measured temperature of the printhead;

calculating an adjusted operating pulse width based on the pulse width adjustment factor and the nominal operating pulse width;

applying the adjusted operating pulse width to the printhead to control printhead temperature; and

controlling the sequence of fire pulses, reducing electromagnetic interference in the printhead ~~assembly~~ and compensating for scan axis directionality errors of the printhead ~~assembly~~ with a firing controller.

Claim 13 (previously presented) The method of controlling the temperature of claim 12 wherein the controller is located on the printhead.

Claim 14 (previously presented) The method of controlling the temperature of claim 12 wherein the controller is located on a printer.

Claim 15 (currently amended) The method of controlling the temperature of claim 12 wherein the controller reads the nominal operating pulse width and the pulse width calibration data from a memory located on the printhead ~~assembly~~.

Claim 16 (previously presented) The method of controlling the temperature of claim 12 wherein the controller reads the nominal operating pulse width and the pulse width calibration data from a memory located on the printer.

Claim 17 (previously presented) The method of controlling the temperature of claim 12 wherein the temperature sensor is an analog temperature sensor.

Claim 18 (previously presented) The method of controlling the temperature of claim 17 further including an analog to digital converter for generating a digital format of the measured analog signal.

Claim 19 (previously presented) The method of controlling the temperature of claim 12 wherein the temperature sensor is a digital temperature sensor.

Claim 20 (previously presented) The method of controlling the temperature of claim 12 wherein the temperature sensor includes multiple temperature sensors distributed around the printhead so as to provide a global measurement of the printhead temperature.

Claim 21 (previously presented) The method of controlling the temperature of claim 12 wherein the pulse width calibration data is in the form of an equation.

Claim 22 (previously presented) The method of controlling the temperature of claim 12 wherein the pulse width calibration data is in a look-up table.